

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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| In re Patent Application of: |) | Confirmation No. 7371 |
| Shunpei YAMAZAKI et al. |) | |
| Serial No. 09/295,607 |) | Examiner: Steven Loke |
| Filed: April 22, 1999 |) | Group Art Unit: 2811 |
| For: SEMICONDUCTOR DEVICE HAVING |) | |
| ALUMINUM NITRIDE FILM |) | November 13, 2006 |

REQUEST FOR RECONSIDERATION

MAIL STOP AMENDMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Office Action mailed August 9, 2006, Applicants respectfully request reconsideration and withdrawal of the rejections of the claims.

In the most recent Office Action, the claims 7, 16, 34 and 46 are rejected under 35 U.S.C. 103(a), as allegedly being unpatentable over Ito (U.S. Patent No. 4,758,896) in view of Serikawa et al. (U.S. Patent No. 5,132,754), and further in view of the Werdecker et al. paper, "Aluminum Nitride – An Alternative Ceramic Substrate for High Power Applications in Microcircuits," (hereinafter, "Werdecker"). This rejection is respectfully traversed.

The Examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. See, *MPEP* §2142. To establish a *prima facie* case of obviousness, three criteria must be met. First, there must be some suggestion or motivation, to modify the references or to combine reference teachings. Second, there must be reasonable expectation of success. Finally, the prior art must teach all the claim limitations. See, *MPEP* §2143.

With respect to claim 7, Applicants believe the rejection is not proper because the Ito, Serikawa et al. and Werdecker et al. documents, whether considered individually or in any combination, fail to teach or suggest the combination of features including "an insulating film comprising aluminum nitride and oxygen provided under said rear surface of the substrate..."

said insulating film comprising aluminum nitride has a thermal conductivity of 0.6 W/cm K or higher,” as set forth in the context of the other recitations of this claim.

In the Action, the Examiner asserts that Ito patent discloses, “a substrate [30c] having a front surface and a rear surface; a composite insulating film [30b, 32] comprising aluminum nitride (AlN) [32] ... and oxygen (oxygen in silicon dioxide [30b]) provided under said rear surface.” The Examiner goes on to acknowledge that Ito fails to teach or suggest the claimed feature of “said insulating film comprising aluminum nitride has a thermal conductivity of 0.6 W/cm K or higher” (see, page 3, lines 1-3), but asserts that Werdecker allegedly discloses these features. However, Werdecker, like Ito, fails to mention anything whatsoever about the claimed insulating film comprising aluminum nitride and oxygen, where that insulating film has a thermal conductivity of 110 to 170 W/m K. It is respectfully submitted that the Serikawa et al. document also is silent with respect to these claimed features.

In addition to the shortcomings pointed out above, it is respectfully submitted that there is no motivation within any of the applied references for the combination proposed by the Examiner. On page 3 of the Action, the Examiner asserts that since both Ito and Werdecker teach an AlN insulating film, it would have been obvious to combine the teachings of Ito with the teachings of the AlN insulating film of Werdecker because such a combination improves heat dissipation. However, while Ito discloses AlN as a suitable material for a *piezoelectric thin film* (see, column 9, lines 29-30), Ito fails to recognize the thermal conductivity of AlN or the ability of heat dissipation. Furthermore, Werdecker may disclose AlN as an attractive *substrate material* (see Abstract of Werdecker) for IC, ECL, VLSI, and laser diode packaging, but there is no mention in Werdecker of AlN use as *piezoelectric thin film*. Nor it does not seem that there is any reasonable motivation to combine the teaching in Ito of a AlN piezoelectric thin film for acoustic wave transmission and having a thickness equal to about one wavelength of the traveling wave (see, column 8, lines 66-68) with the teachings of Werdecker having AlN packaging substrate film, such that one of ordinary skill in the art would have arrived at the present invention.

Moreover, it is respectfully submitted that the proposed combination is insufficient for establishing *prima facie* obvious because it appears the 3-dimensional integrated circuit of Ito would not function as intended with the AlN ceramic of Werdecker. See, *MPEP* § 2143.01.

Further, Applicants believe that it is unreasonable to regard the acoustic surface wave

element layer 32 of Ito as a “substrate,” especially in the context of the Werdecker paper and since it is being combined with this documents. Rather, Ito refers to these elements as “films,” and Werdecker refers to AlN material as substrate for packaging. While Applicants appreciate that the Examiner is afforded latitude when interpreting claim language, any such interpretation must have the meaning that would be recognized by one of ordinary skill in the art. One of ordinary skill in the art would not consider the acoustic surface wave element layer as a substrate.

Even if one were to consider, for the sake of argument, a combination of Werdecker an Ito, it appears that such a hypothetical combination would fail to teach or suggest the claimed insulating film comprising aluminum nitride and oxygen. The Examiner asserts that the acoustic surface wave element layer 32 and the insulating film 30b correspond to the claimed insulating film. However, even if one of ordinary skill in the art were to somehow combine these documents such that AlN ceramic of Werdecker is used to replace the acoustic surface wave element layer 32 and the insulating film 30b of Ito, oxygen is not taught or suggested as presently claimed. Alternatively, if the AlN ceramic of Werdecker is used to replace the acoustic surface wave element layer 32, it would not result in a combination of the insulating film comprising AlN ceramic of Werdecker and the insulating film of Ito having the same thermal conductivity as that of the AlN of Werdecker taken alone. Thus, Applicants believe that there would not have been any reasonable motivation or reasonable expectation of success for one of ordinary skill to combine Ito and Werdecker.

For all the above reasons, neither Serikawa nor Werdecker cure the deficiencies of Ito. Accordingly, independent claim 7 is allowable. Claims 16, 34, and 46 depend either directly or indirectly from of independent claim 7, and are therefore allowable for at least the above reasons, and further for the combinations recited including additional features.

In view of the foregoing, it is respectfully requested that the rejections of record be reconsidered and withdrawn by the Examiner, that claims 2, 3, 6-8, 11, 12, 15-17, 19-35, and 37-67 be allowed and that the application be passed to issue.

Respectfully submitted,

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